

ART III.—*A List of Victorian Rotifers, with Description of Two New Species and the Males of Two Species.*

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(With Plates XXI-XXII.).

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In 1891, under the title of "Notes on Victorian Rotifers,"¹ Mr. H. H. Anderson and myself gave a list of species of *Rotifera* identified up to that date, including several forms described as new. Since that time no further enumeration has been published, although several new species have been recorded. An extended list was submitted by myself at the last Melbourne meeting of the Australasian Association for the Advancement of Science, and occupied the attention of the biological section for a few minutes, but it was not published, and therefore remained unavailable to students of this class. Having in the course of intermittent observations added considerably to the original list, it appears desirable to publish a fresh enumeration, more particularly as it can be supplemented by the inclusion of two new species of *Brachionus*, and the description of the males of two species of *Lacinularia*. As much of the literature of the subject is unprocurable here, I have availed myself of the kind services of Mr. Rousselet, the well-known authority on the class, and submitted to him copies of my drawings of the two unidentifiable forms, and his opinion is that they are certainly new. For the advantage of having all the known Rotifers of Victoria in one record, those mentioned previously are included, but are merely named, an asterisk being used to indicate them, excepting in a few cases where some further remark seemed advisable. The full list now given, as students of the group will know, only partially represents the forms existing in Victoria. Some sustained work would speedily double or treble the total number.

¹ Proc. Roy. Soc. Vict., vol. iv., 1892, pp. 69-80.

Among the species described from Australian forms are some very interesting animals which have a bearing on the question of geographical distribution. Generally the distribution of these animals is regarded as world-wide, and recent discoveries tend to support that opinion. Two of the Australian species have lately turned up, one, *Lacinularia elongata*, near Paris, and the other, *L. elliptica*, in South Africa. There are, however, three species of this genus still unrecorded elsewhere, and it is remarkable that they are strikingly conspicuous forms occurring frequently and in great profusion. A consideration of these forms and their occurrence certainly suggests their adaptation to conditions of frequently recurring periods of drought, combined with wet intervals, when the power of rapid multiplication becomes a favouring factor. With fuller knowledge of this portion of our fauna this indication of distinctiveness may increase, and the thought of such a possibility certainly gives zest to the work of investigation.

The author is responsible for the identifications, excepting a number kindly supplied by Mr. W. Stickland, whose name is appended in each case.

Order I.—RHIZOTA.

Family 1.—FLOSCULARIADAE.

Floscularia.

**F. coronetta*.

F. coronetta, var. Hudson (The Rotifera, Supp., p. 61), syn. *F. tenuilobata*, Anderson (Jour. Asiatic Soc. Bengal, vol. lviii., No. 4, 1889, p. 346).

Mr. Rousselet considers *F. tenuilobata* identical with *F. coronetta* (Jour. Roy. Micro. Soc., vol. xiii., 1893, p. 451). Comparison of the figures of these two forms shows that the difference between them exists chiefly in the form of the knobs at the ends of the lobes of the corona, and that there is agreement in regard to the lobes being of equal thickness down to their bases, instead of widening as in Hudson's figure of *F. coronetta*. The two are much closer in agreement with each other than either of them is with *F. coronetta*. Adopting Rousselet's

decision to reject Anderson's species as distinct from *F. coronetta*, it appears best to regard it as in agreement with Hudson's variety. Dr. Hudson gives a figure supplied by Mr. Burne Poole, of Adelaide, and this is in close agreement with Victorian specimens, of which a considerable number have been seen.

Treasury Gardens, Melbourne ; Heidelberg and Cheltenham.

**F. cornuta*.

**F. campanulata*.

**F. ornata*.

F. trilobata, Collins. Cheltenham.

**F. evansoni*.

**F. ambigua*.

Stephanoceros.

S. eichornii, Ehrenberg.

Botanical Gardens, Melbourne. and lagoons along the Yarra valley.

Family 2.—MELICERTADAE.

Melicerta.

**M. ringens*.

**M. conifera*.

M. fimbriata (Shephard and Stickland. Victorian Nat., vol. xvi., No. 3, p. 38).

Mr. Rousselet in his "Third List of New Rotifers since 1889" (Jour. Roy. Micr. Soc., 1902, pp. 149), queries this as synonymous with *M. tubicolaria*, Ehrenberg. Regarding this opinion it may be pointed out that the distinction chiefly rests on the observed habit of *M. fimbriata* of forming a long filament by means of the organ which in *M. ringens* serves to form a spherical pellet, and in *M. conifera* to produce a conical one. The ventral antennae of *M. fimbriata* are also shorter. The specific characters of *M. tubicolaria*, as given by Hudson and Gosse, are, "Lobes when extended more than three times the width of the body; antennae very long; tube a gelatinous sheath without pellets." *M. fimbriata* differs in regard to the last two of these characters. *M. tubicolaria* has been known since 1838, and appears to have been closely studied by a

number of observers, yet no mention can be found of filaments or pellets being formed by it. Had such an observation been recorded the chief specific character would disappear. *M. fimbriata* undoubtedly uses the ciliated cup to form filaments. It is, of course, possible that the European form may be found to possess this power, but until this is done it appears best to retain the form as a true species.

Limnias.

**L. ceratophylli*.

**L. annulatus*.

**L. granulosus*.

L. shiawasseensis, Kellicott. Botanical Gardens, Melbourne.

Cephalosiphon.

**C. limnias*.

Oecistes.

**O. crystallinus*.

**O. intermedius*.

**O. intermedius*, var.

O. longicornis, Davis. Common.

O. pilula, Wills. Cheltenham.

O. brachiatus, Hudson. Cheltenham.

**O. wilsoni*.

Lacinularia.

**L. socialis*.

**L. pedunculata*.

L. striolata, Shephard. Brighton and Caulfield.

L. reticulata, Anderson and Shephard. Proc. Roy. Soc. Vict., vol. iv., N.S., 1892, p. 73.

The original description of this form contains the statement that it is "found in small colonies."

It has since been found in clusters of quite remarkable size lying on the surface of the mud in a shallow pool in lobose masses upwards of an inch in diameter. These large colonies are masses of adherent dense, gelatinous tubes, and are due to that habit of the young, unlike those of *L. striolata* and *L. pedunculata*, of joining the colony from whence they are

hatched out. The specimens from which the species was first described were in an early stage, the form being prevalent in pools which entirely dry up in summer; small clusters are formed by individuals hatched from resting eggs coming together, and these, under favourable conditions, growing to the dimensions mentioned. At this early stage the colonies are swimming freely, coming to rest later.

A number of free swimming forms were found about and among the females which compose the large aggregations, and their movements left little doubt that they were the males of the species. As will be seen from the figure (Plate XXI., fig. 1) the male animal is elongated and vermiform, with a conical corona and terminal foot. It possesses two red eyes placed well forward, a small dorsal antenna, and a ciliated pit over the foot. The greater part of the interior is occupied by the sperm sac. No traces of an alimentary system were visible. The length was 0.24 mm. : depth, 0.05 mm.

L. elongata, Shephard. It is noteworthy that this species was found near Paris in large numbers in 1909. Some specimens supplied by Mr. Rousselet agree perfectly with the Victorian form.

The species is common along the valley of the Yarra.

L. natans, Western. Very common.

L. elliptica, Shephard. Found in many localities in large numbers, often in company with *L. natans*.

The male of this species was discovered when a very plentiful gathering was under examination. An examination of the figure (Plate XXI., fig. 2) shows a very remarkable form, differing markedly from every other described male of the genus *Lacinularia*, the contrast with the male of *L. natans* being particularly strong, although the females resemble each other so closely as to need careful observation to be distinguished. The animal is of elongated form, the corona being of conical shape with a blind cavity representing the buccal opening of the female. There is a prominent dorsal antenna connected by a nerve thread with a large mass lying immediately behind the corona. About two-thirds of the whole length from the anterior, and dorsally placed, is a ciliated pit with a cluster of glands accompanying it. The posterior end terminates in an acute

cone thickly furnished with cilia. The anterior portion of the body is occupied with a sac filled with spermatozoa. There are two red eye spots placed well forward. Total length, 0.21 mm.; depth, 0.04 mm.

Megalotrocha.

M. alboflavicans, Ehrenberg. Common.

Conochilus.

**C. volvox*.

C. dossuarius, Hudson. Heidelberg.

There is another form of this genus occurring plentifully, which approaches *C. unicornis*, Rousselet, in general characters. There are, however, differences in the position of the dorsal antenna, and the form of the coronal disc, as well as the distinct bifurcation of the antenna at its distal end, which, when compared with Rousselet's figure, suggests varietal if not specific difference. I trust to have further opportunity of studying this animal.

Order II.—BDELLOIDA.

Family.—PHILODINADÆ.

Philodina.

**P. roseola*.

**P. citrina*.

P. megalotrocha, Ehrenberg. Mr. W. Stickland.

Rotifer.

**R. vulgaris*.

**R. tardus*.

R. macrurus, Schrank. Carrum.

R. megaceros, Gosse. Mr. W. Stickland.

Actinurus.

A. neptunius, Ehrenberg. Heidelberg.

Callidina.

A number of forms of this genus have been seen, but not certainly identified.

Order III.—PLOIMA.

Sub-Order.—ILLORICATA.

Family.—MICRODIDAE.

Microdon.

M. clarus, Ehrenberg. Springvale.

Family.—ASPLANCHNADAE.

**A. brightwellii*.

A. amphora, Hudson. Brighton, Caulfield.

There are several other forms of this genus commonly found presenting characters somewhat inconsistent with described species, and further investigation is necessary to elucidate them.

Asplanchnopus.

**A. myrmeleo*.

Sacculus.

S. viridis, Gosse. Mr. Stickland.

Syncheta.

**S. pectinata*.

**S. tremula*.

S. baltica, Ehrenberg. Open water of Port Phillip.

Family.—TRIARTHRADE.

Polyarthra.

**P. platyptera*.

Triartha.

**T. longisetu*.

Family.—HYDATINADAE.

Hydatina.

**H. senta*.

Notops.

N. clavulatus, Ehrenberg. Heidelberg, Brighton and Camberwell.

N. brachionus, Ehrenberg. Wodonga and Camberwell.

Family.—NOTOMMATADAE.

Taphrocampa.

T. saundersiae, Gosse. Mr. Stickland.

Notammata.

* *N. aurita*.

* *N. ansata*.

* *N. naias*.

Copeus.

* *C. ehrenbergii*.

C. labiatus, Gosse. Camberwell. Mr. W. Stickland.

C. caudatus, Collins. Botanical Gardens, Melbourne.

C. pachyurus, Gosse. Cheltenham.

Proales.

P. decipiens, Ehrenberg. Heidelberg.

P. petromyzon, Ehrenberg. Yarra Glen.

Furcularia.

F. longiseta, Ehrenberg. Wimmera River, Horsham ; Woodend.

F. equalis, Ehrenberg. W. Stickland.

Eosphora.

E. digitata, Ehrenberg. Yarra Glen.

Diglena.

* *D. catellina*.

D. biraphis, Gosse. Heidelberg.

Sub-Order.—LORICATA.

Family.—RATTULIDAE.

This family has been most ably treated by Prof. Jennings in his "Monograph of the Rattulidae" (U.S. Fish Commission, Bull. for 1902, pp. 273-352), and his nomenclature is used in naming the species. In future the work of identifying this family should be much simplified.

Rattulus.

- * *R. carinatus*, Lamarek. (= *Mastigocerca carinatus*, Ehr.)
R. rattus, Muller. (= *M. rattus*, Hudson and Gosse.) Mr. W. Stickland.
R. elongatus, Gosse. (= *M. elongata*, Gosse.) Brighton, Woodend.
R. longiseta, Schrank. (= *Mastigocerca bicornis*, Hudson and Gosse.) Yarra Glen.

Diurella.

- D. porcellus*, Gosse. (= *Coelopus porcellus*, Gosse.) Heidelberg.

Family.—DINOCHARIDAE.

Dinocharis.

- * *D. tetractis*.

Scauridium.

- S. longicaudum*, Ehrenberg. Mr. W. Stickland.

Stephanops.

- * *S. muticus*.
S. lamellaris, Ehrenberg. Mr. W. Stickland.

Family.—SALPINADAE.

Diachiza.

- * *D. semiaperta*.
S. eustola, Gosse. Heidelberg.

Family.—EUCHLANIDAE.

Euchlanis.

* *E. dilatata*.

E. triquetra, Ehrenberg. Brighton.

Family.—CATHYPNADAE.

Cathypna.

C. spenceri, Shephard (Proc. Roy. Soc. Victoria, vol. iv., 1892, p. 77, and Victorian Naturalist, vol. 9, 1892, p. 15).

This species was described in the first quoted journal, but no name applied, the specific name being given in the Victorian Naturalist as cited.

C. luna, Ehrenberg. Mr. W. Stickland.

Distyla.

* *D. ichthyoura*.

Monostyla.

* *M. quadridentata*.

M. bulla, Gosse. Willsmere.

M. lunaris. Willsmere.

Family.—COLURIDAE.

Colurus.

* *C. bicuspidatus*.

C. obtusus, Gosse. Mr. W. Stickland.

C. amblytellus, Gosse. Carrum.

Metopidia.

* *M. solidus*.

M. vitrea, Shephard. (= *M. ovalis*, Shephard.) (Anderson and Shephard, Proc. Roy. Soc. Victoria, vol. iv., 1892, p. 78, pl. 12.)

In originally naming this species it was, unfortunately, overlooked that the name "ovalis" had been used by Ehrenberg. *M. oysternum*, Gosse. Willsmere.

Family.—PTERODINADAE.

Pterodina.

P. intermedia*.*P. patina*, Ehrenberg. Treasury Gardens, Melbourne.*P. reflexa*, Gosse. Mr. W. Stickland.*P. valvata*, Hudson. Mr. W. Stickland.P. trilobata*, Shephard.

A form has been discovered in South Africa which Mr. Rousselet considers specifically identical with this form, though much larger in size. The measurement given in the original description was $1/250$ in. or 0.102 mm. The length of the South African form was stated as $1/76$ in., or .334 mm. I have had several opportunities of examining specimens of *M. trilobata* from different localities since the form was first described, and the results of two series of measurements were:—Length of lorica, 0.21 mm. and 0.19 mm.; breadth, 0.19 mm. and 0.18 mm. respectively.

This form has been collected at Sandringham, Rosstown, and Yarra Glen, some thirty miles apart. Specimens examined quite recently were in close agreement with Mr. Dixon-Nutall's figure in the position of the lateral antennae, the form of the gastric glands, and general appearance, excepting the bosses on the loria, which were absent.

Family.—BRACHIONADAE.

Brachionus.

B. rubens*.B. bakeri*.*B. bakeri*, var. *brevispina*, Rousselet. Heidelberg.*B. mülleri*, Ehrenberg. Carrum and Warrnambool. In brackish water.*B. urceolaris*, Ehrenberg. Mr. W. Stickland.*B. militaris*, Ehrenberg. Heidelberg.*B. falcatus*, Zacharias.

This very striking form was found at Willsmere, and comparison with European specimens kindly sent to me by Mr. Rousselet left no doubt as to its identity. The four very pro-

minent anterior and posterior spines differed in length and curvature, but not to the extent found in some other species of the genus. The dimensions of the specimens were:—Length of lorica, without spines, 0.15 mm.; total length, 0.45 mm.; breadth, 0.15 mm.

B. angularis, Gosse. The forms found vary from the figures given in "The Rotifera." A comparison made between actual specimens may establish a variety. The points of agreement are, however, such as to suggest that the discrepancies may be due to inadequate figuring of the European specimens.

B. lyratus, n.sp. (Plate XXI., figs. 5 and 6) Templestowe and Black Rock. This form, viewed on the dorsal surface, is of ovate outline, swelling towards the lumbar region. At the anterior two short outwardly curved spines are placed on either side of a notch occupied by a well-developed dorsal antenna, and on each side of these spines there is a pair of slight acute prominences. At the posterior end there is a deep, squarish recess, made deeper by two knobbed projections which curve outwards in a manner suggesting the form of a lyre. A lateral view shows the lorica to be arched dorsally, being highest towards the posterior end; the ventral surface is flat. Viewed ventrally the lorica possesses a wavy outline at the anterior, with two lines running backwards and inwards on either side. These two lines are, I believe, a view of the edges of two triangular plates so placed as to cause the lorica to gape and thus form an opening for the protrusion of the corona; whether these plates are flexible, and thus permit of closure of the opening, was not determined. The animal is of a pale brownish colour. The lorica is covered with minute papillae, and is indistinctly faceted. The small lumbar antennae occur in the usual position. The corona, foot, mastax, eye and internal structure generally present the characters usual in the genus. Dimensions:—Length of lorica, 0.16 mm.; breadth, 0.135 mm. Heidelberg.

B. dichotomus, n.sp. (Plate XXII., figs. 3 and 4). This form was met with in the same gathering as *B. lyratus*. Dorsally, the lorica presents a somewhat ovate shape, truncated anteriorly and provided with two long spines branching outwards so as to form a V-shaped notch between

them, and curving inwards at their free ends. Posteriorly two still longer straight spines are set so as to form a broad curve between them. There is also at the posterior end, overhanging the bases of the spines, a projecting plate having a gentle outward curve in the centre, and then sweeping outwards at each side to form two short acute points. Ventrally the lorica shows the same outline excepting the anterior portion, which reveals a flap-like appearance of similar arrangement to that of *B. lyratus*. The lorica is transparent and very faintly stippled. The dorsal antenna is of considerable length, and the lumbar pair are very small and placed quite at the lateral edges. The long foot, corona, eye and internal organs agree with those of the genus generally. The length of the lorica without spines is 0.12 mm. ; over all, 0.3 mm. ; breadth, 0.1 mm.

Family.—ANURAEADAE.

Anuraea.

* *A. curvicornis*.

* *A. aculeata*.

A. cochlearis, Gosse. Cheltenham.

Several other forms of this genus are known, but in view of the variability of the genus they have been left for further study.

Order.—SCIRTOPODA.

Family.—PEDALIONIDAE.

Pedalion.

P. mirum, Hudson.

This form is quite common in the lagoons of the Yarra valley. Some slight differences as compared with Hudson's description have been noted, and more scrutiny is needed, but it appears unlikely that more than varietal differences will be established.